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10/080,754

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Gerald W. Fly

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HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS, MI 48303

EXAMINER

CANTELMO, GREGG

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* GERALD W. FLY and BRIAN K. BRADY

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Appeal 2009-3002  
Application 10/080,754  
Technology Center 1700

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Decided:<sup>1</sup> May 8, 2009

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Before EDWARD C. KIMLIN, ROMULO H. DELMENDO, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

## STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from a final rejection of claims 1-4, 9, 10, and 13-18. (Appeal Brief filed April 12, 2006, hereinafter “App. Br.”; Final Office Action entered July 11, 2005, hereinafter “FOA”). Claims 6-8, 11, 12, and 20-25 have either been allowed or indicated as containing allowable subject matter (FOA 4; Ans. 7).<sup>2</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

Appellants’ claimed invention relates to a fuel cell system having an improved bipolar plate assembly (Specification, hereinafter “Spec.” ¶ 0008). According to Appellants, the invention is useful in many applications including a power source for an electrical vehicle to replace internal combustion engines (*id.* at ¶¶ 0003, 0008).

Claim 1, the sole independent claim on appeal, reads as follows:

A fuel cell comprising:

- a membrane electrode assembly having a membrane, a first catalytic layer on a first face of said membrane and a second catalytic layer on a second face of said membrane;

- a first bipolar plate assembly adjacent said first catalytic layer and in electrical contact therewith, said first bipolar plate assembly including:

- a first gas distribution layer having a plurality of porous, reactant gas flow channels extending transversely through said first gas distribution layer in a generally parallel orientation, a first face of said first gas distribution layer confronting said first catalytic layer such that said plurality of porous, reactant gas

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<sup>2</sup> In the FOA, claim 20 is indicated as rejected in the Office Action Summary (PTOL-326), but is not rejected under any ground (FOA 2-4). Also, in the Examiner’s Answer, the only discussion of claim 20 occurs in the Allowable Subject Matter section (Ans. 7).

flow channels are in fluid communication with said first catalytic layer; and

a first non-porous impermeable, conductive separator plate secured to a second face of said first gas distribution layer;

a second bipolar plate assembly adjacent said second catalytic layer and in electrical contact therewith, said second bipolar plate assembly including:

a second gas distribution layer having a plurality of porous, reactant gas flow channels extending transversely through said second gas distribution layer in a generally parallel orientation, a first face of said second gas distribution layer confronting said second catalytic layer such that said plurality of porous, reactant gas flow channels are in fluid communication with said second catalytic layer; and

a second non-porous impermeable, conductive separator plate secured to a second face of said second gas distribution layer.

(App. Br. 10; Appendix A)<sup>3</sup>

The prior art reference relied upon by the Examiner to reject the claims on appeal is:

Cipollini

6,258,476 B1

July 10, 2001

The Examiner rejected claims 1, 3, 13, 15, and 17 under 35 U.S.C. § 102(e) as anticipated by Cipollini (Ans. 3). Also, the Examiner rejected claims 2, 4, 9, 10, 14, 16, and 18 under 35 U.S.C. § 103(a) as unpatentable in view of Cipollini (Ans. 5).

The Examiner found that Cipollini teaches every limitation of the invention recited in claim 1 (Ans. 3-4). With respect to the claimed first and

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<sup>3</sup> The Appeal Brief does not contain numbered pages. Nevertheless, we number the pages of the brief 1-18 starting with the first page, which has the heading “APPEAL BRIEF,” and refer to these page numbers in this Opinion.

second “non-porous impermeable, conductive separator plate[s],” the Examiner acknowledged that Cipollini discloses a *porous* separator plate (*id.* at 7-8). Nevertheless, the Examiner asserted that “it is apparent that the pores of [the separator plate], when filled with water, results in a plate which is non-porous to materials other than water” (Ans. 8, ll. 20-21).

Appellants, on the other hand, contend that Cipollini discloses a porous separator plate and that “[r]egardless of whether water is able to fill the pores or not, the structure of [Cipollini’s disclosed separator] has *pores* and is therefore *porous*” (App. Br. 6, ll. 16-22).

With regard to the second ground of rejection, the Examiner concluded that it would have been obvious to one of ordinary skill in the art to modify the teachings of Cipollini to arrive at the recited limitations of porosity, permeability, electrical resistance, material selection, and plurality of coolant flow channels of the dependent claims 2, 4, 9, 10, 14, 16, and 18 (Ans. 5-7).

Appellants, with regard to the second ground of rejection, maintain the focus of their arguments on the separator plate as recited in claim 1 and respond that “[a]ny obviousness rejection of the present claims is inappropriate, as Cipollini teaches away from the invention of claim 1 and the remainder of the rejected claims each depend from claim 1” (App. 8, ll. 13-15).

#### ISSUE

Thus, the sole issue arising from the contentions between the Examiner and Appellants is:

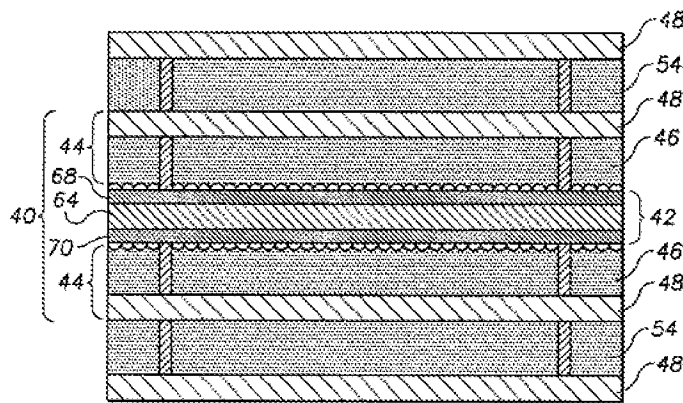
Have Appellants shown reversible error in the Examiner's finding that Cipollini discloses a non-porous separator as is required by the claimed invention?

### FINDINGS OF FACT (FF)

Findings of Fact throughout this Opinion are supported by at least a preponderance of the evidence of record.

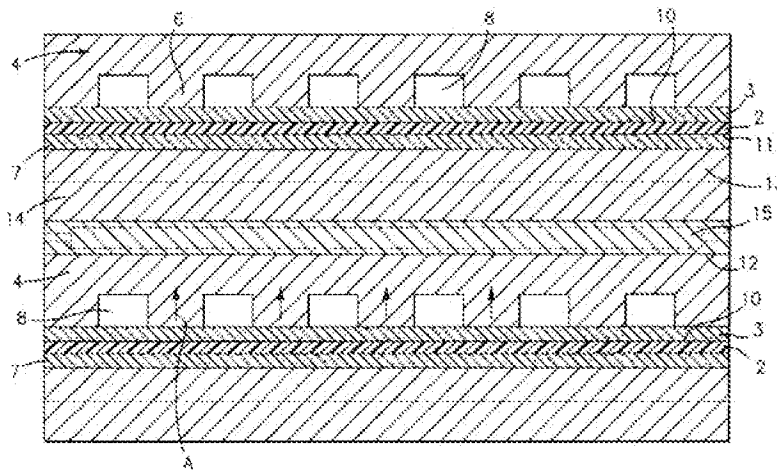
1. Appellants' Fig. 8 is reproduced below:

**FIG. 8**



- Fig. 8 depicts a bipolar plate assembly 44 including a separator plate 48 and a gas distribution layer 46 (Spec. ¶ 0042).
2. Appellants' Abstract discloses that "[e]ach bipolar plate assembly further includes a non-porous, conductive separator plate" (Abstract, ll. 10-11).
  3. In addition, Appellants' figures show separator plates that do not have a porous structure (Figs. 5-17).
  4. Cipollini discloses a fuel cell having porous plates that remove product water from the oxidant side of a fuel cell membrane to

- prevent cell flooding and supply water to the anode side of the membrane to prevent dryout (Abstract; col. 7, ll.33-38).
5. Cipollini discloses:
- [W]ater may be removed from the cathode side of the membrane surface, and/or supplied to the anode side of the membrane [sic] surface, by porous carbon plates which have been rendered highly wettable and hydrophilic by partially filling the pores of the carbon plates with certain metal oxyhydroxides [col. 1, ll. 9-15].
6. Cipollini discloses that “[w]hen the pores of the carbon plate are partially filled with the metal oxyhydroxide compound, the plate becomes highly wettable by water, and the gas pressure differential which may be applied to the plate increases without the danger of breakthrough of the reactant gas” (col. 4, ll. 25-30).
7. Cipollini’s Fig. 2 is reproduced below:



8. Cipollini discloses “[t]he surface of . . . the plate 13 opposite its ribs contacts a gas impermeable member 14 which, in turn, contacts the coolant water channel 15 in the product water transfer member 4 of the adjacent cell” (col. 5, ll. 25-26 and 31-35).

### PRINCIPLES OF LAW

Adopted claim construction must be “reasonable in light of the totality of the written description.” *In re Baker Hughes*, 215 F.3d 1297, 1303 (Fed. Cir. 2000).

“To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.” *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

### ANALYSIS

#### *Claims 1, 3, 13, 15, and 17 Rejected as Anticipated by Cipollini*

Claim 1 requires a “non-porous” separator (Claim 1). However, the Examiner contends that “the extent or specific degree to which the separator is non-porous and impermeable is not defined by the claim and [is] open to an interpretation which is broader than what Appellant argues” (Ans. 8, ll. 16-18). Therefore, the Examiner asserts:

[T]o the extent that the claim fails to define how the separator plate is non-porous and impermeable, it is maintained that when water is provided in the plate of Cipollini, the separator plate is non-porous to materials other than water and impermeable to the reactants of the fuel cell. As such, Cipollini still anticipates the claimed separator plate of the instant claims” (Ans. 9, ll. 4-8).



We do not agree with the Examiner. In the Specification, the separator plate is described as non-porous and the figures depict separator plates without a porous structure (FF 1-3). This description reasonably informs one skilled in the relevant art that the claim limitation in question (*i.e.*, “non-porous” separator plate) requires a separator without a porous structure so that the plate is non-porous, even with respect to water. Thus, one of ordinary skill in the art would have understood the claimed non-porous separator plate could not reasonably be construed to cover porous separator plates.

In direct conflict with the claim limitation at issue, Cipollini discloses a *porous* separator plate (FF 4-8). Even when filled with water, the separator has a porous structure and provides a path for water moving through the pores towards or away from the fuel cell membrane (FF 4 and 5).

Under these circumstances, the Examiner erred in interpreting the claims in a manner directly contrary to Appellants’ Specification. *Baker Hughes*, 215 F.3d at 1303.

*Claims 2, 4, 9, 10, 14, 16, and 18 Rejected as Obvious in View of Cipollini*

The Examiner does not rely on any argument or evidence to show that it would have been obvious to one of ordinary skill in the art to modify Cipollini’s porous separator plate to arrive at the claimed non-porous plate (Ans. 4-10). For the same reasons as discussed above, we do not uphold the Examiner’s rejection of dependent claims 2, 4, 9, 10, 14, 16, and 18.

CONCLUSION

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Application 10/080,754

Appellants have shown reversible error in the Examiner's finding that Cipollini discloses a non-porous separator as required by the claimed invention.

**ORDER**

The decision of the Examiner rejecting claims 1, 3, 13, 15, and 17 under 35 U.S.C. § 102(e) and claims 2, 4, 9, 10, 14, 16, and 18 under 35 U.S.C. § 103(a) is reversed.

**REVERSED**

ack

cc:

HARNESS, DICKY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS MI 48303